

Mercury Monitoring in Precipitation Across the Midwest/Great Lakes Region

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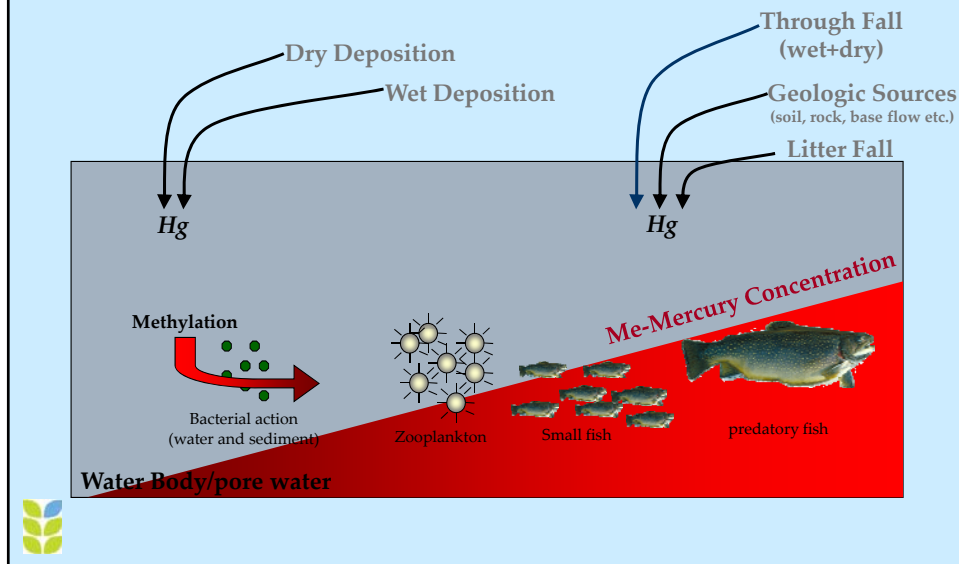
Goal of this Presentation....



- ☐ A *short* introduction to the
Mercury Deposition Network.
- ☐ A description what we know about the
deposition of mercury and trends.
- ☐ A few research plans.



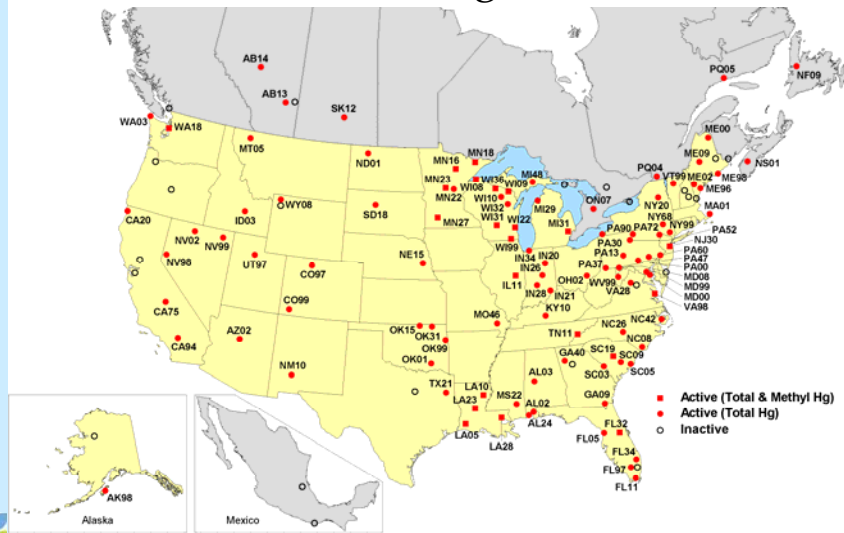
Bioaccumulation of methyl mercury



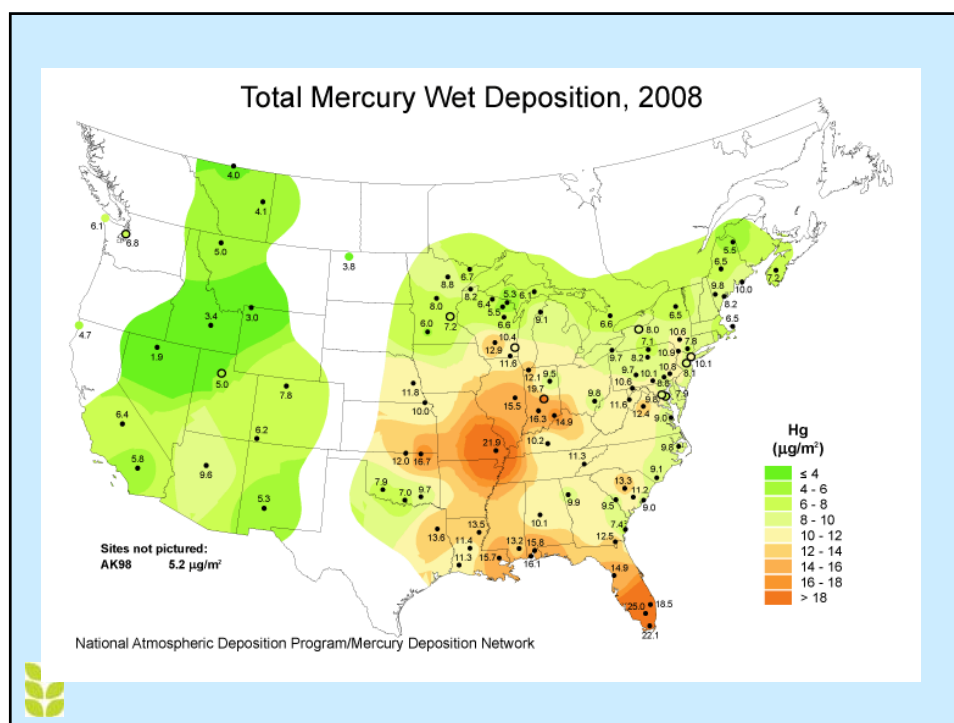
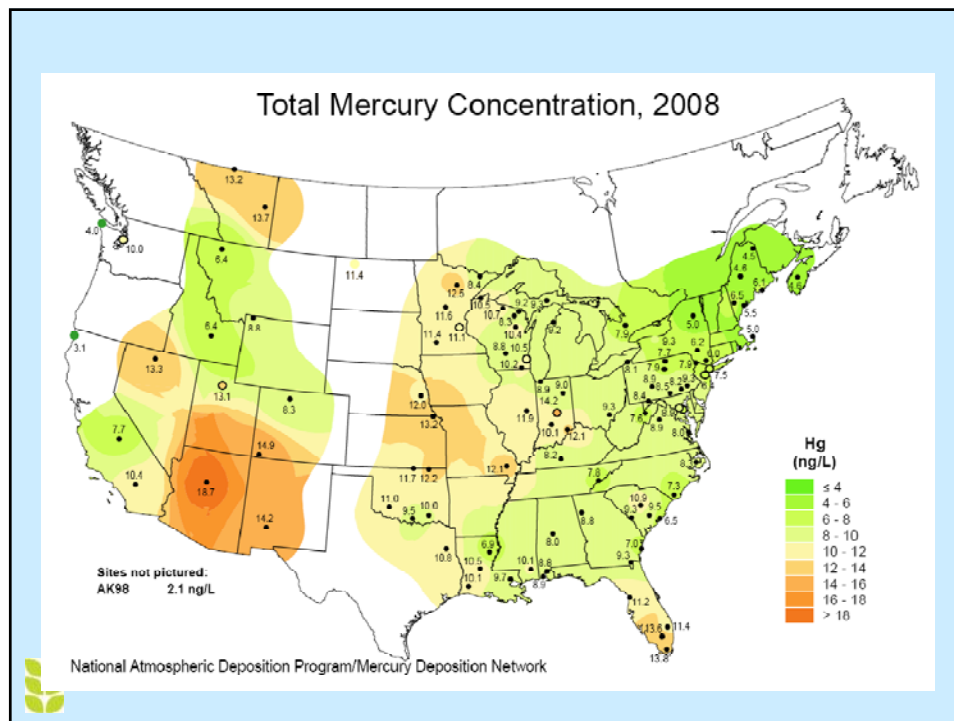
What is the *Mercury Deposition Network*?

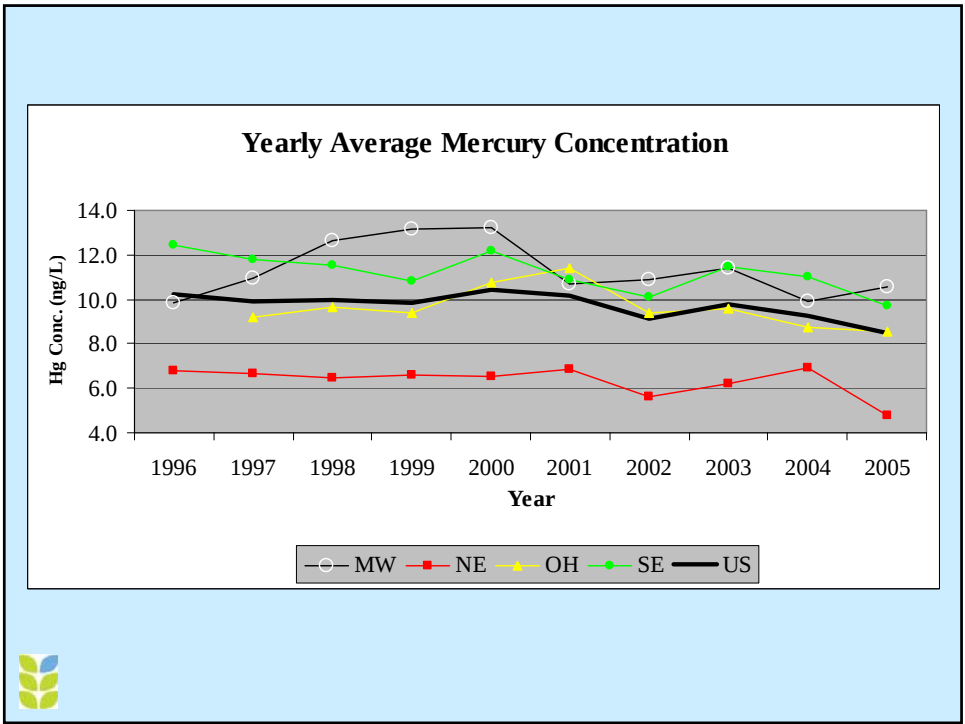
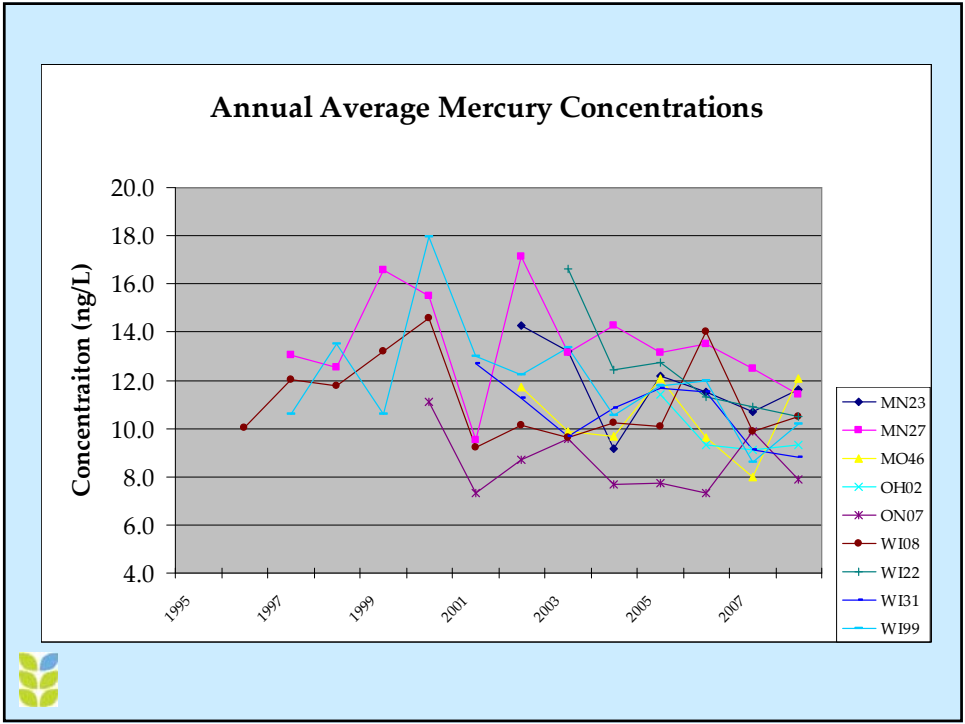
- A Cooperative Research Program
 - Part of National Atmospheric Deposition Network
 - 115 sites
 - Federal, State, Local and Tribal Governments members, private organizations
 - Measuring wet deposition of mercury
- Our Charge:
 - *to determine if trends exist in wet deposition of mercury over time*

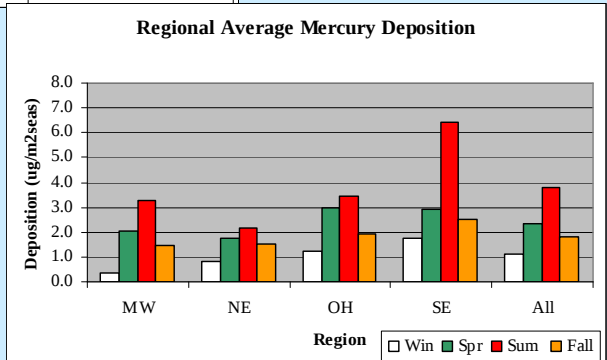
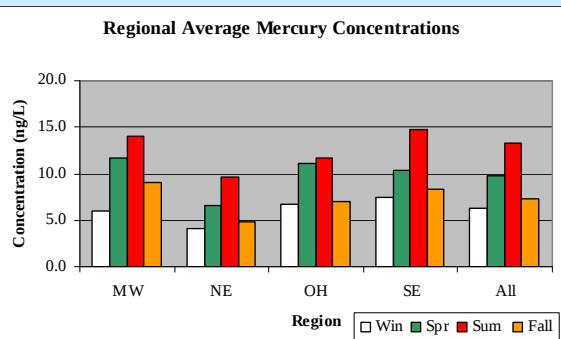
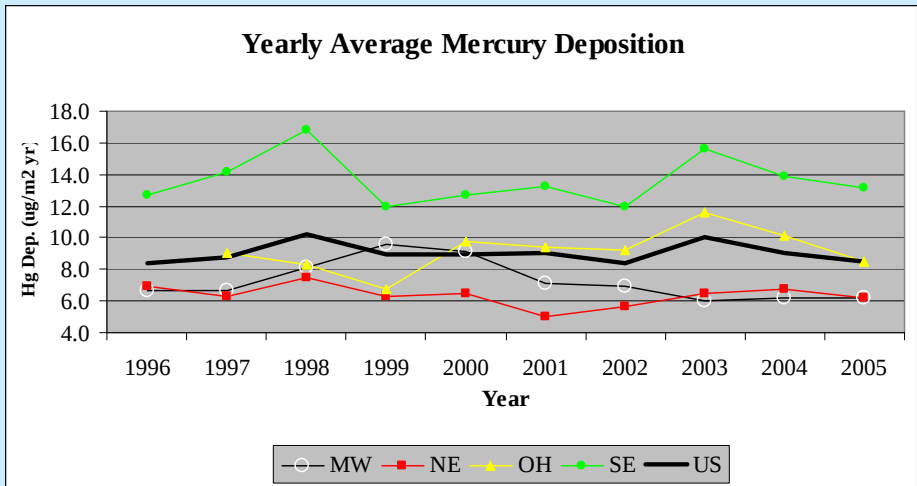
MDN Wet Deposition Monitoring Sites



What the Data Show....







Trends In Concentration & Deposition



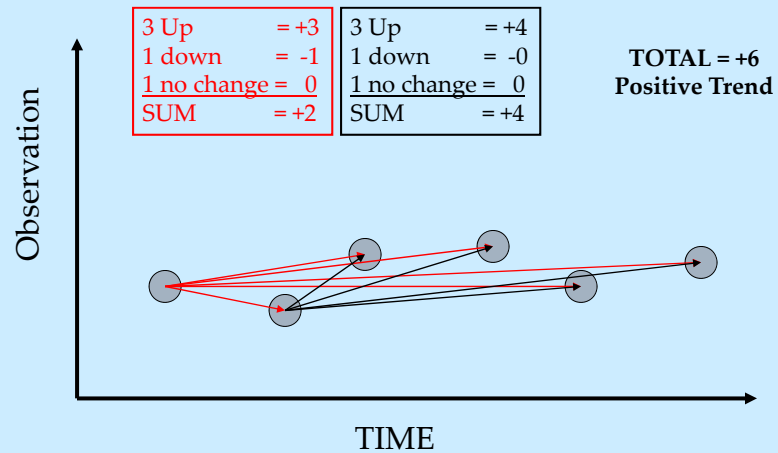
Trend Methods

- Seasonal Kendall Test for Trends
- Seasonal Kendall Slope Estimator
- Regional Kendall Test for Trends

- From the “Mann Kendall” as extended by van Belle and Hughes, 1984
- non-parametric, normality not assumed
- allows for seasonality and multiple stations
- allows for missing data
- from “Statistical Methods for Environmental Pollution Monitoring”, R. O. Gilbert, 1987 & Helsel & Frans, 2006 EST 40 pp4066
- Examines differences over time
 - Difference (obs1 – obs2) > 0, then =+1
 - < 0, then =-1
 - = 0, then = 0

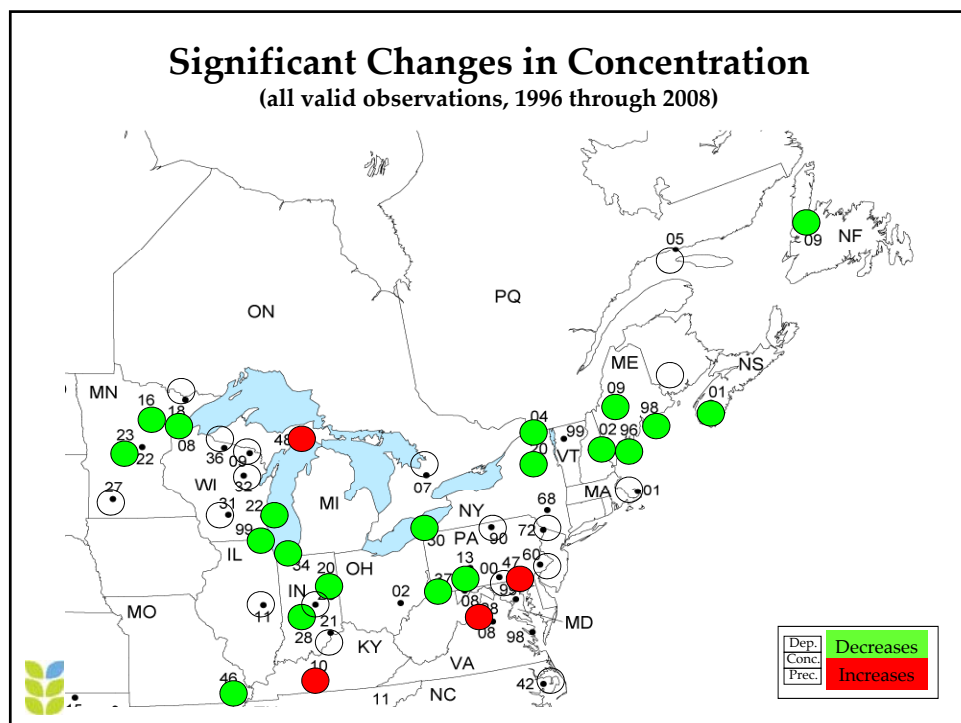
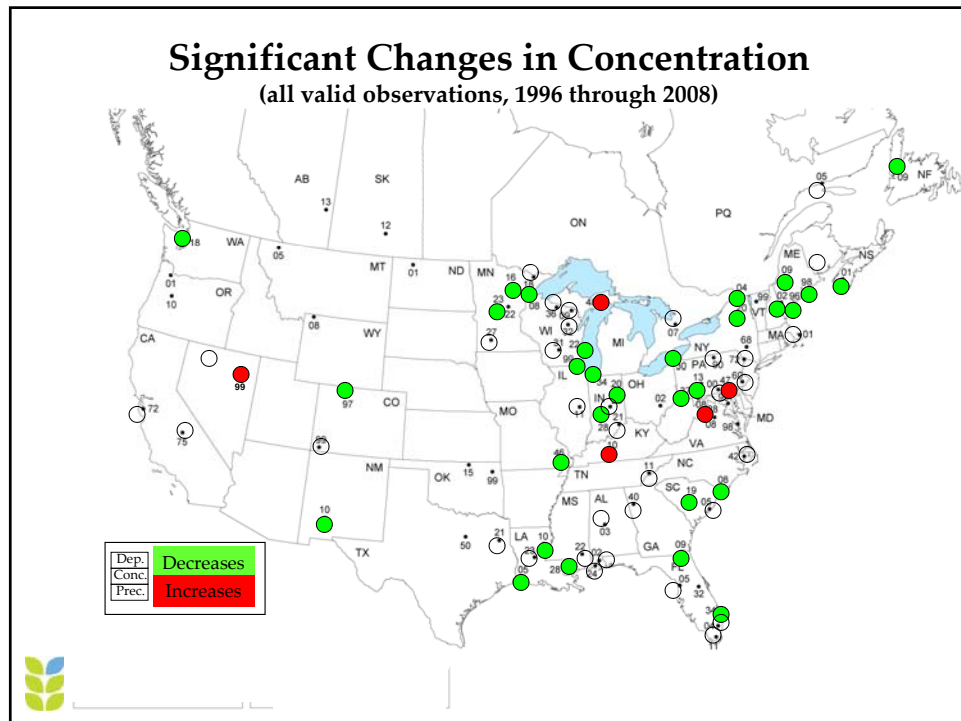


Seasonal Kendall Example

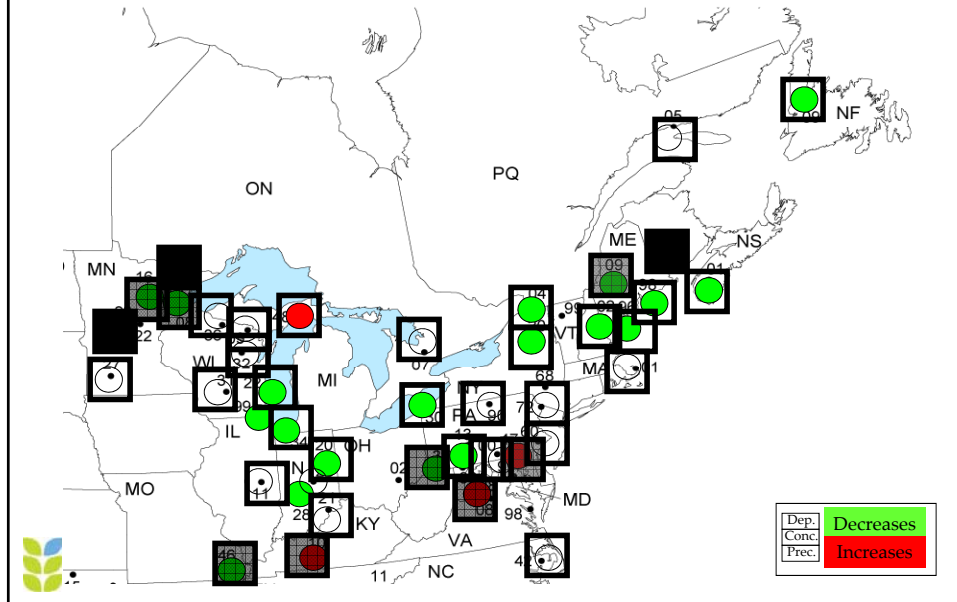


Conditions For Trend Tests

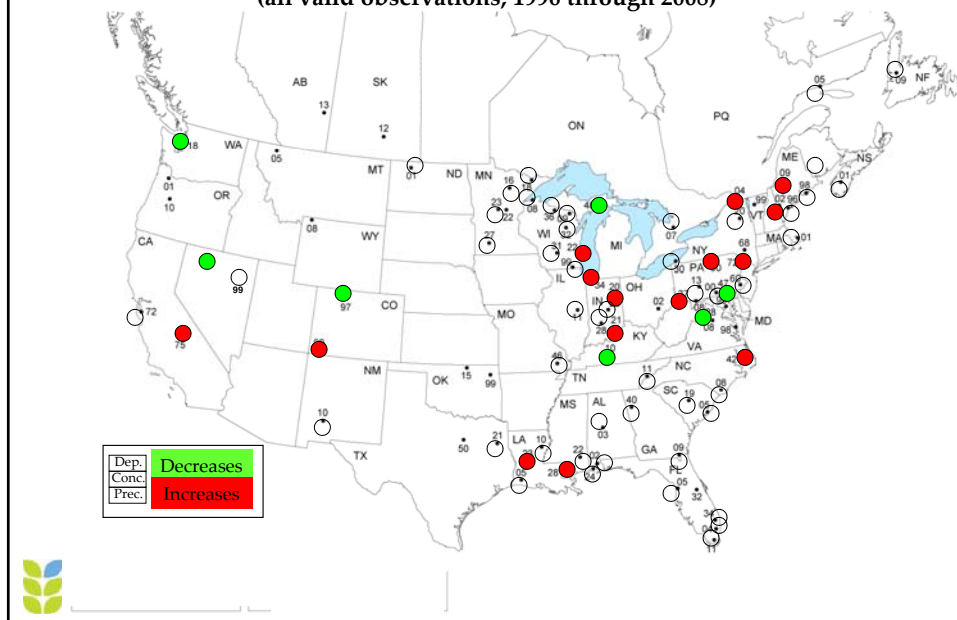
- At least 75% valid observations for 5 or more years
 - 1996 through 2008 (68 sites)
- Run seasonally
- No "Trace" events

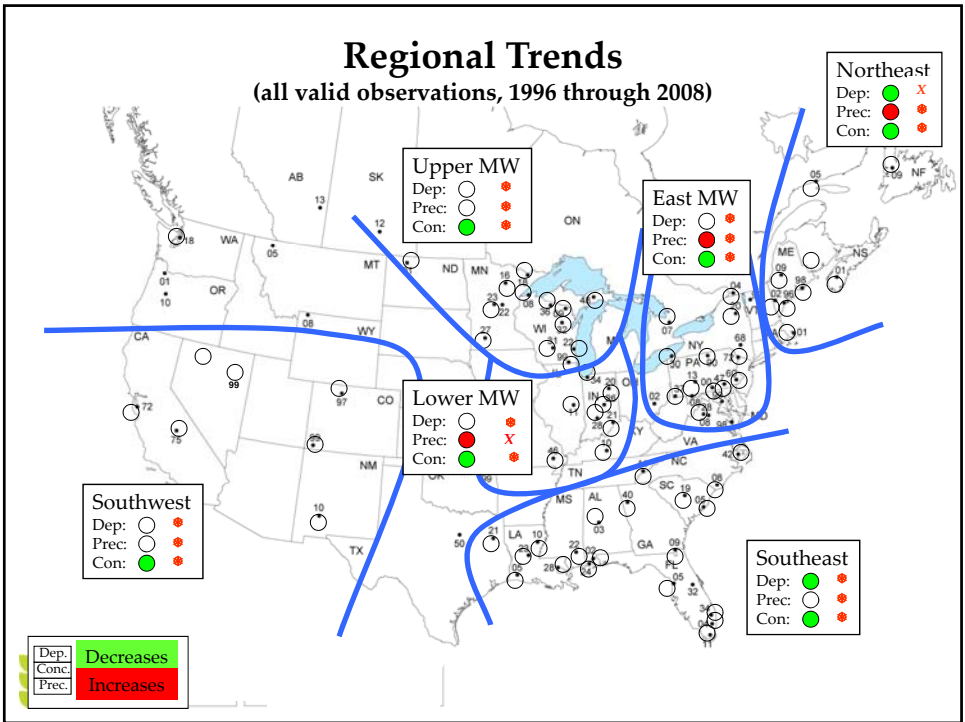
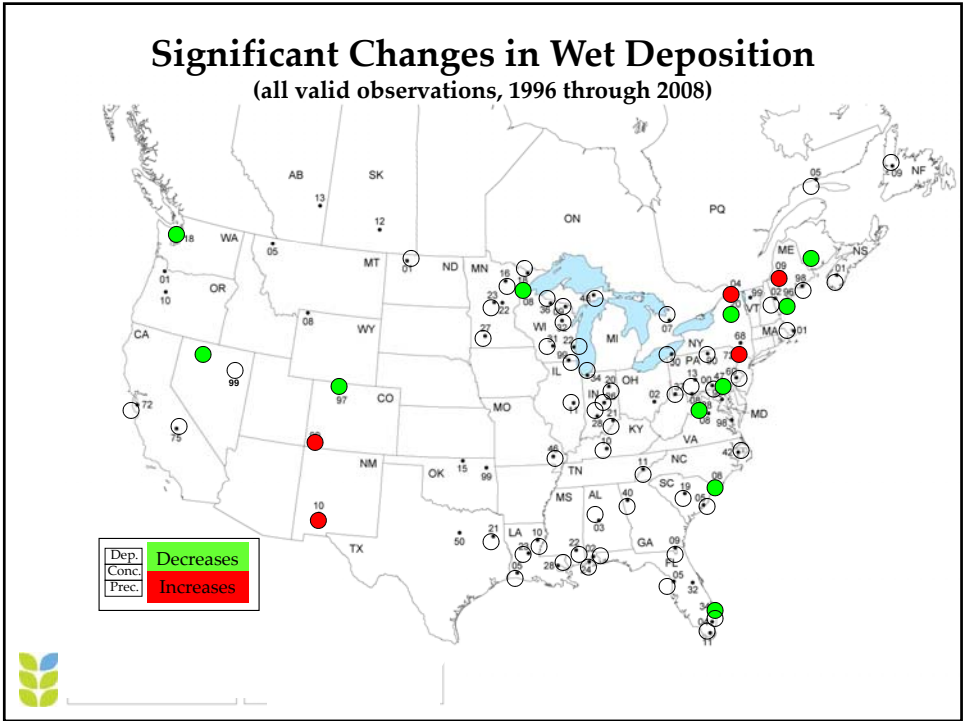


Independent Confirmation of Same



Significant Changes in Precipitation (all valid observations, 1996 through 2008)





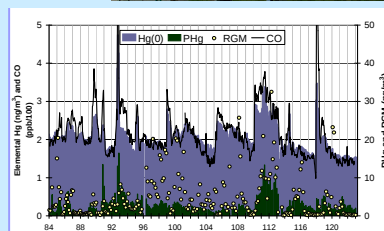
Dry Deposition

?

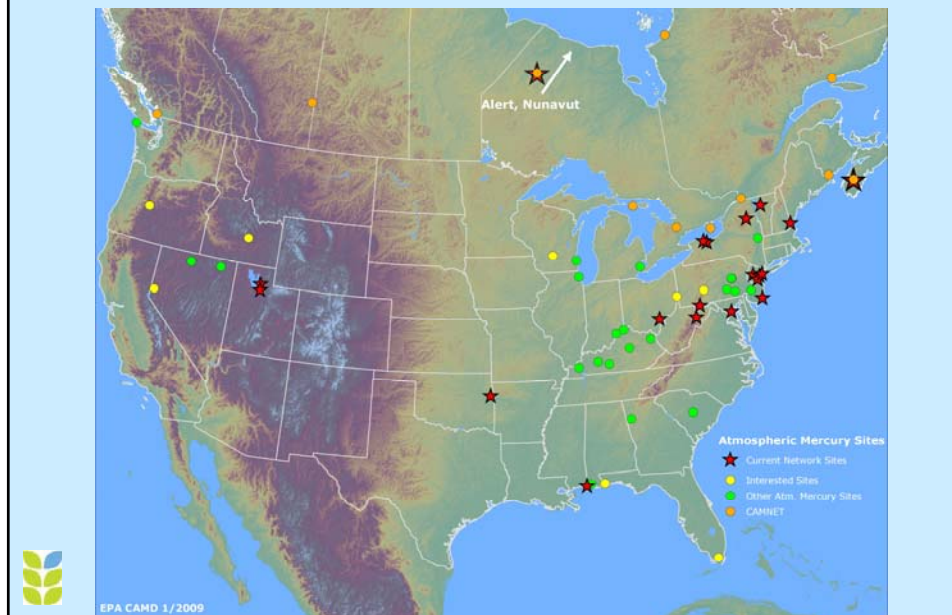


Future Directions: Measurements for Dry Deposition

- A New NADP Network
- Measure:
 - wet deposition flux (MDN),
 - Hg species (Tekran system)
 - meteorology and land cover variables
- Immediate priority: areas with strong impact from local and regional Hg sources
- Estimate Dry Deposition



Candidate 2008 NADP Atmospheric Hg Network Sites



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